REMARKS

By this Amendment, claims 1, 10 and 15 have been amended to further recite the claimed invention. Applicant has amended the currently pending claims in order to expedite prosecution and does not, by this Amendment, intend to abandon subject matter of the claims as originally filed or later presented, and reserves the right to pursue such subject matter in a continuing application. Claims 1-13 and 15-17 are pending. Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Entry of the Amendment is proper under 37 C.F.R. §1.116 as the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not present any new issues that would require further consideration and/or search as the amendments merely amplify issues discussed throughout the prosecution; (c) do not present any additional claims without canceling a corresponding number of claims; (d) place the application in better form for appeal, should an appeal be necessary; and (e) were not made earlier because they are made in response to the points first presented in the final Office Action. Entry of the Amendment is thus respectfully requested along with withdrawal of the final Office Action.

Claims 1-12 and 15-17 were rejected under 35 U.S.C. § 103(a) based on European Patent Application Publication No. 1020897 to Tanaka et al. (hereinafter referred to as "Tanaka et al.") in view of U.S. Patent No. 6,533,952 to Klebanoff et al. (hereinafter referred to as "Klebanoff et al."). The rejection is respectfully traversed.

Applicant respectfully submits that the cited portions of Tanaka et al., Klebanoff et al., and any proper combination thereof fail to disclose, teach or suggest a lithographic projection apparatus comprising, *inter alia*, a gas supply, configured and arranged to supply a gaseous hydrocarbon to a space containing a mirror, at least one sensor selected from the group comprising a reflectivity sensor to monitor a reflectivity of said mirror and a pressure sensor to monitor a background pressure in said space, and a gas supply control, responsive to a signal from said at least one sensor to control said gas supply to control a layer formed on the mirror using the gaseous hydrocarbon as recited in claim 1.

First, Applicant submits that the rejection fails to set forth a proper *prima facie* case of obviousness by improperly combining Tanaka et al. with Klebanoff et al. In particular, contrary to MPEP 2143.01 and 2143.02, the teachings of Klebanoff et al. and Tanaka et al. conflict, the proposed modification of Tanaka et al. would render the Tanaka system

unsatisfactory for its intended purpose, and a reasonable expectation of success for the proposed modification has not been set forth.

Examiner proposes that the inert gas of Tanaka et al. may be supplemented with hydrocarbons or else substituted with hydrocarbons. However, this is contrary to the teachings of Tanaka et al. and such a combination or substitution would render unsatisfactory that on which Tanaka et al. is based. In particular, Tanaka et al. teach that a gas supply device 150 is used for filling spaces formed between optical elements in a lens barrel "*with an inert gas.*" See, e.g., Tanaka et al., Abstract. Tanaka et al. further teach that the purpose of using an inert gas is to reduce attenuation of ArF excimer light as it passes through an optical system due to absorption by oxygen and ozone in the light path. See, e.g., Tanaka et al., paras. [0007]-[0008]. Thus, Tanaka et al. aim to have an optical system with hardly any ArF excimer laser light attenuation. See, e.g., Tanaka et al., para. [0011]. To that end, Tanaka et al. further teach circulating inert gas through spaces in the optical system to improve transmittance by removing "foreign matter...such as water and hydrocarbons or other substances that diffuse the exposure light [, that] become adhered to the lenses 21 or suspended within the light path." See Tanaka et al., paragraph [0044]. Thus, Tanaka et al. expressly teach against supplying hydrocarbons into the spaces in an optical system.

In contrast, Klebanoff et al. provide teachings that clearly conflict with Tanaka et al. and that would render unsatisfactory the Tanaka et al. system. Particularly, Klebanoff et al. teach supplying hydrocarbon but in combination with the presence of water vapor and EUV radiation. See, e.g., Klebanoff et al., col. 3, lines 60 to col. 4, line 7. Moreover, the presence of such hydrocarbons can lead to reduction in the reflectivity of mirror surfaces. See, e.g., Klebanoff et al., col. 4, lines 8-15. To help overcome this reduction of reflectivity, Klebanoff et al. teach providing oxygen containing gas. Thus, Klebanoff et al. teach providing hydrocarbons, water vapor and oxygen, each of which Tanaka et al. expressly teach to keep out of the optical system to improve transmittance. Thus, the addition of hydrocarbons in the Tanaka et al. system directly conflicts with the teachings of Tanaka et al. and would render the Tanaka et al. system unsatisfactory for its intended purpose of having high transmittance.

Moreover, even if the proposed combination were otherwise proper, the Examiner has not shown a reasonable expectation of success for the proposed combination. The teachings of Klebanoff et al. relate to high energy radiation, such as EUV radiation, while the teachings of Tanaka et al. relate to relatively low energy radiation, i.e., ArF laser radiation. It is not clear that the introduction of hydrocarbons as taught by Klebanoff et al. would be effective in the

ArF system of Tanaka et al. and the Examiner has not made the appropriate showing that there would be a reasonable expectation of success.

Thus, there is no proper teaching or suggestion in either Tanaka et al. or Klebanoff et al. that the inert gas of Tanaka et al. can be combined with or replaced by the hydrocarbons of Klebanoff et al. Thus, there is no motivation to combine Tanaka et al. and Klebanoff et al. as applied to the claims of the present application, and the asserted combination is improper.

Moreover, even assuming *arguendo* that Tanaka et al. and Klebanoff et al. were properly combinable (which Applicant submits they are not), Applicant respectfully submits that the combination does not teach or suggest the claimed invention of claim 1.

The cited portions of Klebanoff et al. fail to disclose, teach or suggest a gas supply control, responsive to a signal from a reflectivity sensor to monitor a reflectivity of a mirror and/or a pressure sensor to monitor a background pressure in the space to control said gas supply to control a layer formed on the mirror using the gaseous hydrocarbon as recited in claim 1. There is simply no disclosure, teaching or suggestion in Klebanoff et al. of any sort of gas supply control, let alone one responsive to a signal from a sensor.

Further, Applicant submits that the cited portions of Tanaka et al. fail to overcome the shortcomings of Klebanoff et al. For example, the pressure sensor of Tanaka et al. is used to determine whether a space in the optical system of Tanaka et al. has been sufficiently evacuated so that the inert gas can be introduced and then to monitor the supply of the inert gas so as not to be overly pressurized to thereby impact optical performance. See, e.g., Tanaka et al., paragraph [0044]. Further, the pressure sensor of Tanaka et al. is used to control a lens element to optically compensate for the pressure of the inert gas. See, e.g., Tanaka et al., paragraph [0041].

However, Applicant respectfully submits that the cited portions of Tanaka et al. fail to disclose, teach or suggest a gas supply control, responsive to a signal from, e.g., a pressure sensor to control said gas supply to control a layer formed on the mirror using the gaseous hydrocarbon. Even if Tanaka et al. were modified to include supply of hydrocarbons (which Applicant disagrees it properly could in view of Klebanoff et al.), it is respectfully submitted that the cited portions of Tanaka et al. fail to provide any teaching or suggestion regarding a control system to control gas supply to control a layer formed on the mirror using gaseous hydrocarbon. Tanaka et al. at most teaches controlling whether the pressure is too high or low in the space but in no way suggest or teaches control of a layer formed on a mirror.

Therefore, for at least the above reasons, the cited portions of Tanaka et al., Klebanoff et al., and any proper combination thereof fail to disclose, teach or suggest all the features recited by independent claim 1.

For similar reasons as provided above with respect to claim 1, Applicant respectfully submits that the cited portions of Tanaka et al., Klebanoff et al., and any proper combination thereof fail to disclose, teach or suggest a method of manufacturing a device using a lithographic projection apparatus comprising, *inter alia*, supplying a gaseous hydrocarbon to a space within the lithographic projection apparatus containing a mirror, monitoring at least one of a reflectivity of said mirror and a background pressure in said space, and controlling an amount of gaseous hydrocarbon supplied to said space in response to the monitoring to control a layer formed on the mirror using the gaseous hydrocarbon as recited in claim 10.

As noted above, Applicant respectfully submits that Tanaka et al. and Klebanoff et al. are not properly combinable as the teachings of Klebanoff et al. and Tanaka et al. conflict, the proposed modification of Tanaka et al. would render the Tanaka system unsatisfactory for its intended purpose, and a reasonable expectation of success for the proposed modification has not been set forth. Moreover, even assuming *arguendo* that Tanaka et al. and Klebanoff et al. were properly combinable (which Applicant submits they are not), Applicant respectfully submits that the combination does not disclose, teach or suggest controlling an amount of gaseous hydrocarbon supplied to said space in response to the monitoring to control a layer formed on the mirror using the gaseous hydrocarbon.

Therefore, for at least the above reasons, the cited portions of Tanaka et al., Klebanoff et al., and any proper combination thereof fail to disclose, teach or suggest all the features recited by independent claim 10.

Applicant also respectfully submits that the cited portions of Tanaka et al., Klebanoff et al., and any proper combination thereof fail to disclose, teach or suggest a method of manufacturing a device using a lithographic projection apparatus comprising, *inter alia*, supplying a gaseous alcohol to a space in a radiation system of the lithographic projection apparatus, which space contains a mirror, wherein the alcohol forms a cap layer on said mirror, wherein the projecting causes sputtering of the cap layer, and wherein the gaseous alcohol is supplied to said space at a pressure sufficient to achieve a thickness of said cap layer which does not increase substantially over time as recited in claim 15.

Contrary to the Examiner's argument, Klebanoff et al. teach in col. 2, lines 20-27 that exposure of a Mo/Si mirror to hydrocarbons and EUV radiation led to the growth of a 230

Angstrom thick layer of carbon, which reduced reflectivity from 66% to 12%. See Klebanoff et al, col. 2, lines 27-31. Thus, those cited portions of Klebanoff et al. do not disclose a thickness of a cap layer which does not increase substantially over time, rather it increased substantially enough to significantly reduce reflectivity.

Klebanoff discloses combining water vapor and ethanol in certain measure, and exposing both to EUV radiation, to balance the carbon build-up resulting from exposure to ethanol against the reduction of oxidation due to the water vapor. The result, according to Klebanoff et al., is a relatively thin layer of carbon. However, Klebanoff et al. fail to appreciate or address effects of sputtering and the need to protect the mirror from such sputtering. Accordingly, the balance of Klebanoff et al. may not result in a cap layer at all due to the effects of sputtering. Accordingly, Applicant respectfully submits that Klebanoff et al. fail to disclose, teach or suggest supplying gaseous alcohol at a pressure sufficient to achieve a thickness of a cap layer which does not increase substantially over time where the projecting causes sputtering of the cap layer. In effect, a cap layer is maintained to protect the mirror but it is one that does not increase substantially over time so that it, for example, does not significantly affect the performance of the mirror.

Therefore, for at least the above reasons, the cited portions of Tanaka et al., Klebanoff et al., and any proper combination thereof fail to disclose, teach or suggest all the features recited by the independent claims 1, 10 and 15. Claims 2-9 depend from independent claim 1 and are, therefore, patentable for at least the same reasons provided above related to claim 1, and for the additional features recited therein. Claims 11 and 12 depend from independent claim 10 and are, therefore, patentable for at least the same reasons provided above related to claim 10, and for the additional features recited therein. Claims 16 and 17 depend from independent claim 15 and are, therefore, patentable for at least the same reasons provided above related to claim 15, and for the additional features recited therein. As a result, Applicant respectfully submits that the rejection under 35 U.S.C. §103(a) of claims 1-12 and 15-17 in view of Tanaka et al. and Klebanoff et al. should be withdrawn and the claims allowed.

Claim 13 was rejected under 35 U.S.C. § 103(a) based on Tanaka et al. in view of Klebanoff et al. and further in view of U.S. Patent No. 6,469,785 to Duveneck et al. (hereinafter referred to as "Duveneck et al."). The rejection is respectfully traversed.

As discussed above, Applicant submits that the cited portions of Tanaka et al. in view of Klebanoff et al. fail to disclose, teach or suggest claim 10.

Furthermore, the cited portions of Duveneck et al. fail to overcome any of the deficiencies of Tanaka et al., Klebanoff et al., or any proper combination thereof. Duveneck et al. simply have no disclosure, teaching or suggestion regarding monitoring at least one of a reflectivity of said mirror and a background pressure in said space; and controlling an amount of gaseous hydrocarbon supplied to said space in response to the monitoring to control a layer formed on the mirror using the gaseous hydrocarbon as recited in claim 10. Duveneck et al. is merely cited to disclose a multilayer mirror.

Therefore, for at least the above reasons, the cited portions of Tanaka et al., Klebanoff et al., Duveneck et al. and any proper combination thereof fail to disclose, teach or suggest all the features recited by claim 13. As a result, Applicant respectfully submits that the rejection under 35 U.S.C. §103(a) of claim 13 in view of Tanaka et al., Klebanoff et al. and Duveneck et al. should be withdrawn and the claim allowed.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 03-3975 under Order No. 081468/282980. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,
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